..CLASSIFIED ADS

FOR SALE: Model 28 w/3 speed gear shift and answer back, excellent condition, $1,000. Model 19, 60 wpm, good condition - $75.00. Model 19, 75 wpm, weather, complete - needs work, $35.00 Model 14 typing reperf, 60 wpm, good condition, $30.00 WA6QFN, Al, 15861 Rose Lane, Westminister, CA. 92683. Phone: (714) 893-8972.

EXPERT REPAIR WORK. Any Teletype Corp. model. Repair work $15.00 plus parts no matter how long it takes. Rebuilding by estimate. Write K9WRL or phone (312) 392-2358, ask for Neil. Chicago Area.

"HOW TO BUILD DIGITAL EQUIPMENT" New, fast, inexpensive ways applies to any device. Eliminates costly printed circuit boards. Detailed instructions, plans - $1.95. Satisfaction guaranteed. Creative Resources, Box 58872, Houston, Texas 77058.

FOR SALE: 28 ASR WITH AUTO CR LF. Non overline, perfect condition. $750.00 J.M. Torrence, 1326 Parkview Circle, Salisbury, N.C. 28144 - (704) 633-3296.

TELETYPE EQUIPMENT: Full line Model 28 page and tape equipment. Floor Mark II sproket RO $195.00. ASR cabinets $50 and up. Also model KSR's and RO's. 14-15-19-28 parts and assemblies. Vintage vacuum tubes. SASE for list of equipment. K8JOF2448 N. Wilson, Royal Oak, MI. 48073.

EXTEL

CONTINUED FROM PAGE 2

was built by K9ZNE which draws little current and monitors a transistorized receiver output. When tone appears, the autocall relays turns on the rest of the printer, which responds in time to receive the first incoming character. This has been used to copy 170 Hz. shift transmissions transmitted on two meters in the Chicago region, and for some distance outside, depending, of course, on the readability of the signal. In general, good copy is had whenever the 2-meter FM signal is suitable for fair voice communications.

This is a good printer for radio, because it does not run open when received signals begin to fade and mark disappears. Instead, it goes automatically to "Mark-Hold" and waits for a new signal. A circuit alarm lights to indicate that the circuit is OPEN or in the space condition. Because of the nature of its electronic circuitry, it has a high noise immunity and the ability to correctly interpret signals containing 45-% distortion. It has been tested extensively by W9IRY for HF radio, using weather, and W1AW, as well as other ham signals.

So far, not much has been made of Extels within the amateur fraternity because they do not yet appear as "used" in the surplus market, looking for ham homes.

Perhaps one of these days, some of the press association who use so many of them will make some updates. If it happens, we will let you know.

At present, a new 15 cps unit costs $1,350, equipped for DC signals and operation at regular amateur speeds, receiving only.

Further information from R.D. Cortright, Extel Corp, 310 Anthony Trail, Northbrook, IL. 60062

****

FIRST CLASS MAIL

ADDRESS CORRECTION REQUESTED

RTTY JOURNAL
P.O. Box 837
Royal Oak, MI. 48068

RTTY JOURNAL

September 1975

EXCLUSIVELY AMATEUR RADIO TELETYPE

VOLUME 23, No. 7 — 30 Cents

KB-1 See page 3

Surplus ASCII keyboard mounted in console made from business machine cover by W6OXP. Unit includes keyboard interface, character counter and adjustable EOL, ASCII to Baudot converter, and UT-4. See article on page 3.

CONTENTS -

C.A.R.T.G DX RTTY SWEEPSTAKES - - - - - - 2
EXTEL PRINTER - - - - - - - - - - - - - - 2
KB-1 KEYBOARD - - - - - - - - - - - - - - 3
VHF NEWS - - - - - - - - - - - - - - - - - 8
UART PROBLEM - - - - - - - - - - - - - - - 9
DX NEWS - - - - - - - - - - - - - - - - - - 10
HAM SIZE COMPUTERS - - - - - - - - - - - - 13

C.A.R.T.G. RTTY DX SWEEPSTAKES

THE CANADIAN AMATUER RADIO TELETYPE GROUP (C.A.R.T.G.) Sponsors The 15th Annual W/W RTTY DX "Calgary Centennial" Sweepstakes

1. Saturday, October 4th, 0200 GMT to Monday, October 6th, 1975, 0200 GMT. Not more than 30 hours of operation is permitted. Non-operating periods can be taken at any time during the contest. Summary of times on and off must be submitted with score.
2. **BANDS** - All amateur bands 3.5 to 28 MHz.
3. **COUNTRY STATUS*** ARRL Country List - KL7, KH6 and VO to be considered as separate countries.
4. **CLASSIFICATIONS** -
   (a) Single Operator (one transmitter)
   (b) Multi-operator (one transmitter)
   (c) SWL Printer
   Individual operators of multi-operated stations may submit their Logs singly instead of a Group Log.
5. **MESSAGES** - Message number, Time GMT and Zone.
6. **EXCHANGE POINTS** - (a) all two-way RTTY QSO's with own zone counts 2 points.
   (b) All others will receive points listed in Zone Chart (same chart as used last year).
   (c) Stations may not be contacted more than once on any one band. Additonal contacts counted on different bands.
7. **MULTIPLIERS** - Each country contacted including ones own on each band. e.g. If one country worked on 3 bands, three multipliers given. Each USA and Canadian District will be considered a separate country.
8. **SCORING** - Total exchange points x number of Continents (Max. 6). Canadian Bonus Points added last - 100 Bonus points for each VE/VO contact. Use separate Log Sheet for each band. Log Sheets and Zone Charts available for SAE or IRC's. Logs must be received by December 1st 1975 to qualify.

AWARDS

1. "Calgary Centennial Plaque
2. Plaque - "C.A.R.T.G."
3. Plaque - "RTTY JOURNAL"
4. Plaque - "C.A.R.T.G."
5. Plaque - A "CARTG" Member
6. "RTTY JOURNAL"
7. Plaque - "C.A.R.T.G."
8. Plaque - "RTTY JOURNAL"
9. Plaque - "C.A.R.T.G."
10. Plaque - "RTTY JOURNAL"
11. High Score USA - Gold Medallion & Ribbon - "RTTY JOURNAL"
12. High Score Canada - Gold Medallion & Ribbon - Canadian Director ARRL
13. Green RTTYer - (First RTTY Contest) Sidney Burnett Memorial Plaque
14. Most 2-way RTTY 40 m contacts Plaque - "C.A.R.T.G."
15. Most 2-way RTTY 80 m. contacts Plaque - "RTTY JOURNAL"
16. SWL Printer High Score Plaque - "C.A.R.T.G."
17. Multi-operated station high score - Plaque "RTTY JOURNAL"
18. Low Power (under 100 w) Plaque - "C.A.R.T.G."
19. Certificates for top scores in each U.S.A. and Canadian District and each Country.

Send Logs and Score Sheets to:
Canadian Amateur Radio Teletype Group
85 Fifeshire Road
Willowdale, Ontario CANADA M2L 2G9

EXTEL PRINTER

The Extel teleprinter which was pictured on the front page of the July-August issue of RTTY is of interest to those readers who have embraced the modern concept of design, using solid state devices - and there is lots of evidence in RTTY that many of you are doing just that.

The first EXTEL series was introduced about three years ago. Initially, the machines introduced were for receiving only (RO). Now there are Keyboard Send Receive (KSR) sets available. Production has just started on a series of full ASR machines, complete with solid state memory.

The major portion of each unit is solid state electronics. The earlier versions make use of TTL integrated circuits, for logic to sort out control functions, and convert, via a read-only memory, from the signalling code to a machine language which drives the printing mechanism.

Printing is accomplished by means of 7 pins which actually hit the pressure sensitive paper, or a ribbon which marks the paper. Each character is made up of a combination of dots unique to that particular character. The normal format is a series of dots selected from a 5 x 7 dot pattern. For some special symbols, as with the weather, additional dots are used, by printing in a portion of normal space area between characters.

The printing head is moved with a stepping motor. Paper feeding is also done with one. Stepping motors lend themselves to logic systems since they move in prearranged movement patterns. Each step of these motors is a fixed amount of a circle. The stepping motors drive a gear mechanism, linked to the part being driven through a glass-fibre cog belt.

Printing speeds up to 150 or 300 w.p.m. are readily accommodated with the Extel unit being described. The actual operating speed is determined by the use of a crystal controlled clock, which also is the "clock" for the logic system.

If you are familiar with the operation of mechanical printers, you know they can annoyingly drop characters on carriage return. They also overprint. In this electronic printer, automatic carriage-return/line feed can easily be provided, and, by using solid state buffer storage, the characters being sent while the carriage goes back are stored then printed out after the carriage has fully returned and is ready to go again.

After the return is made, the printing speed is increased to allow the buffer to empty. Automatic line feed, whenever a carriage return is received, prevents overlining, and is available for units used on radio circuits.

The five-level code is the only code authorized for amateur use. But, a number of other codes are commonly used in practical communications. Newswires use a six-level "Teletypesetter" code. The eight-level ASCII code is now widely used as a standard for computer communications and other similar applications. Each can be accommodated by changing the logic board from the printer and changing the clock timing crystal.

The machine is quite compact (5" x 12 5/8" x 15 1/2"). For 6 inch paper, a smaller unit is available, which lends itself to mobile application. Since it does not depend on 60 Hz. power for synchronization, it lends well for use where stable power is not available - mobile, for instance.

W9IRY has operated one of the printers in his car now for over two years. During part of this time, the operation has been by using a standard 115 volt AC unit and a 12 volt DC to 115 V AC converter. A 12 volt direct conversion power supply was subsequently built. To conserve on battery, a special 12 volt direct operating frequency shift converter

CONTINUED ON PAGE 16

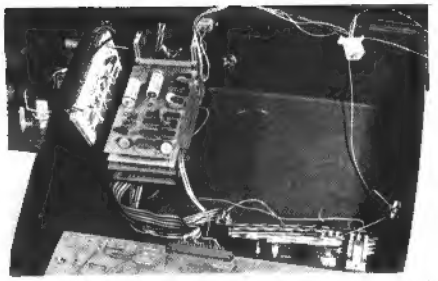
KB-1 KEYBOARD

COLE ELLSWORTH, W6OXP
10461 Dewey Dr.
GARDEN GROVE, CA. 92640

The author recently became the owner of an ASCII (American Standard Code for Information Interchange) encoded four-row keyboard purchased for a local parts emporium. Of relatively recent surplus vintage, it had originally been used in a computer terminal. The keyboard electronics consisted principally of a 40-pin LSI encoder chip similar to the General Instrument Corporation AY-5-2376. Several 7400 series chips composed the remainder of the circuit. Parallel format outputs included the 7-bit ASCII code, plus a parity bit, and the key-pressed signal (keyboard strobe). In addition, two key-switch non-encoded functions were available; "REPEAT" and "INT" (similar to WRU). All outputs were TTL-compatible positive true logic levels, although each of the eight data bit outputs was capable of driving only one TTL load.

The reason for acquiring the keyboard in the first place was to incorporate it in a computer terminal with video display to provide a man-microprocessor communications link. However, other applications came to mind, such as converting the 8-level ASCII code to Baudot 5-level code for amateur band use. And, should the FCC see fit to permit 8-level codes on the amateur frequencies, a proper interface would make such operation easy to accomplish. It became apparent that a number of keyboard support functions such as character counter, EOL indicator, Repeat Function generation, data output buffering, and keyboard strobe control would be required to provide maximum versatility in the aforementioned applications.

After an analysis of the keyboard support requirements and a projection of probable usage of the keyboard in varied applications, a logic diagram evolved that met all the requirements for my particular keyboard. It should be noted that keyboards, like canned soup, come in many varieties. Some designs have data outputs that are negative true TTL levels (Mark equals Low level). Some have mixed outputs where the strobe is positive logic and the data bits are



Inside view of console showing method of mounting and interconnecting the five PCB and keyboard. The PCB on the far left is a catch-all for peripheral drivers and other accessory functions.

negative logic. Some recent designs have on-board LSI encoders that have a built-in repeat function (the strobe signal pulses at a ten-Hz rate when a character key is held down more than about 1/2 second) while others do not even have a repeat key. So as to make the support logic as versatile as possible, a number of options were provided in the final design and the result was named the Key-Board Interface - version 1 (KBI-1). Figure 1 illustrates the interface unit logic diagram and connection to the keyboard. Figure 2 shows the Digital Read-Out (DRO-1) logic diagram which includes the EOL decoder.

FEATURES

1. Provides buffered (up to 30 TTL loads) positive true data outputs (U3, U4) for the eight data bits with either positive true or negative true inputs.
2. Provides for strobed (3-state) outputs to allow connection to standard data bus or normal 2-state outputs by means of jumper JM5.
3. Provides repeat function generator if desired (JM6).
4. Allows strobe and repeat functions from either positive or negative logic keyboard outputs (JM1, JM2, JM3, JM4).
5. Provides four variations in strobe outputs:
   a. Negative-going strobe pulse remaining at a low level until key is released (strap JM7 A to B).
   b. Positive-going strobe pulse remaining at a high level until key is released (strap JM7 A to C).
   c. Negative-going strobe pulse with variable delay and variable pulse width (strap JM7 A to D).
   d. Same as c. except positive-going strobe pulse (JM7 A to E).
6. Provides a character counter and LED display that counts only the

printing ASCII characters plus space bar. Counter is reset to 00 on receipt of ASCII LINE FEED function.

7. Provides End-Of-Line (EOL) indication at any desired character count. EOL indicator is also reset by the LINE FEED function.

CIRCUIT NOTES

For interface to keyboards with positive true logic outputs, U3 and U4 should be the 74367 non-inverting 3-state buffers. In this case U3A and U4A are jumpered as follows: U3A - JMI open, JM4 A to B; U4A - JM2 open, JM3 A to B. Note that in this configuration all keyboard data outputs must be positive logic including the strobe and repeat signals. There is no provision for handling negative logic strobe and repeat signals when data bits are positive logic. If required, outboard inverters could be used in this case.

For interface to keyboards with negative logic data outputs and **negative or positive** logic strobe and repeat signals, U3 and U4 are 74368 inverting buffers. Pinout and control levels are identical with the 74367. For a negative logic strobe from the keyboard, U4A JM2 is open and JM3 A to B. For positive logic strobe, JM2 is jumpered and JM3 A to C. Similar jumper conditions apply to U3A for negative or positive logic REPEAT signals.

If the keyboard has on-board repeat character function, then U1, U2A, and U3A are not required and may be disabled by connecting JM6 A to C (in this case U1 and associated capacitors and resistors need not be installed). If keyboard has the repeat function key but no repeat oscillator, connect JM6 A to B for a ten Hz pulsing of the keyboard strobe.

In normal non-strobe bipolar data outputs are desired (no high impedance third state), connect JM5 A to C. If 3-state data outputs are desired (U3 and U4 pass data only during presence of Keyboard Strobe pulse and outputs revert to a high impedance state when strobe pulse is not present) connect JM5 A to B. For initial tests of the KBI-1, JM5 should be strapped A to C.

The four variations in strobe signal output are selectable by JM7. Connect JM7 A to B for negative-going strobe staying high until key is released. JM7 A to D and A to E select negative or positive strobe pulses as required. U14A R5 and C4 are selected to provide the required strobe delay, and U14B R6 and C5 are selected to provide the desired pulse width.

Thus, it is apparent that while the KBI-1 will provide interface for the majority of keyboard logic configurations, all possible permutations are not available. The KBI-1 is **not** directly compatible with non-coded keyboards, keyboards coded for IBM codes such as EBCDIC or SELECTRIC, or Keypunch (Hollerith) codes. In other words, before you consider use of the KBI-1, your keyboard must meet three conditions: 1. Outputs must be in a 7-bit parallel ASCII encoded format with or without parity bit. 2. Outputs must be TTL compatible. 3. Must have a strobe (key-pressed) signal output.

The character counter section of the KBI-1 provides a two-digit display (00 to 99) of the number of printing characters (and space bar) generated. A portion of this circuit is located on the DRO-1 board (see figure 2). It will not count control functions. The display is reset to 00 whenever LINE FEED key is pressed. EOL indication is provided by lamp DS-1. This circuit operates by detecting a preset number demined by strapping outputs of U11 and U12 to the inputs of U7D. Decimal thumbwheel Switches (S1, S2) may be used for convenience in changing the set point if desired. Otherwise, straps are run from U7D inputs to the desired outputs on U11 and U12. At the preset count, the EOL indicator illuminates and remains illuminated until LINE FEED key is depressed.

CONSTRUCTION

Circuit layout and wiring is not critical provided normal rules of TTL Logic are followed. Printed circuit boards greatly facilitate and speed construction and are recommended in particular to those who are not familiar with digital logic hardware. New, high quality components should be used to reduce or eliminate debugging problems. Surplus or reclaimed components may be used if you have the proper facilities for testing. Sockets or Molex pins are recommended for the ICs as even brand new chips from a franchised distributor have been found defective. Check and double check the orientation of pin 1 of the chip with the socket.

C1, the timing capacitor for U1, may require selection to keep the repeat function rate at ten Hertz or less. R1 and R2 should be 5 percent 1/4 watt. R4 is required for the recommended EOL lamp and -12 volt supply. R4 may be replaced by a jumper if a 5-volt lamp and -5 volts is used in this application.

PRINTED CIRCUIT BOARDS

Electronic Development Inc. (EDI) of Salem, Oregon has been authorized to make the two printed circuit boards (KO1-1 and DRO-1) available for this project. No other sources of PCB are expected to be available. P.C. boards only, or complete kits may be obtained. See EDI ads in the Journal for address and availability information. The boards are high quality epoxy glass, double sided with plated-through holes and fit standard .156 inch spacing, 18-position double readout edge connectors. The edge connector references on the logic diagram are identical with the EDI PCB edge connections.

TROUBLESHOOTING

At the time of this writing, three persons have built the KBI-1 and three different ASCII encoded keyboards have been used. These were surplus units manufactured by Clare-Pendar, Microswitch, and Tektronix. Various problems

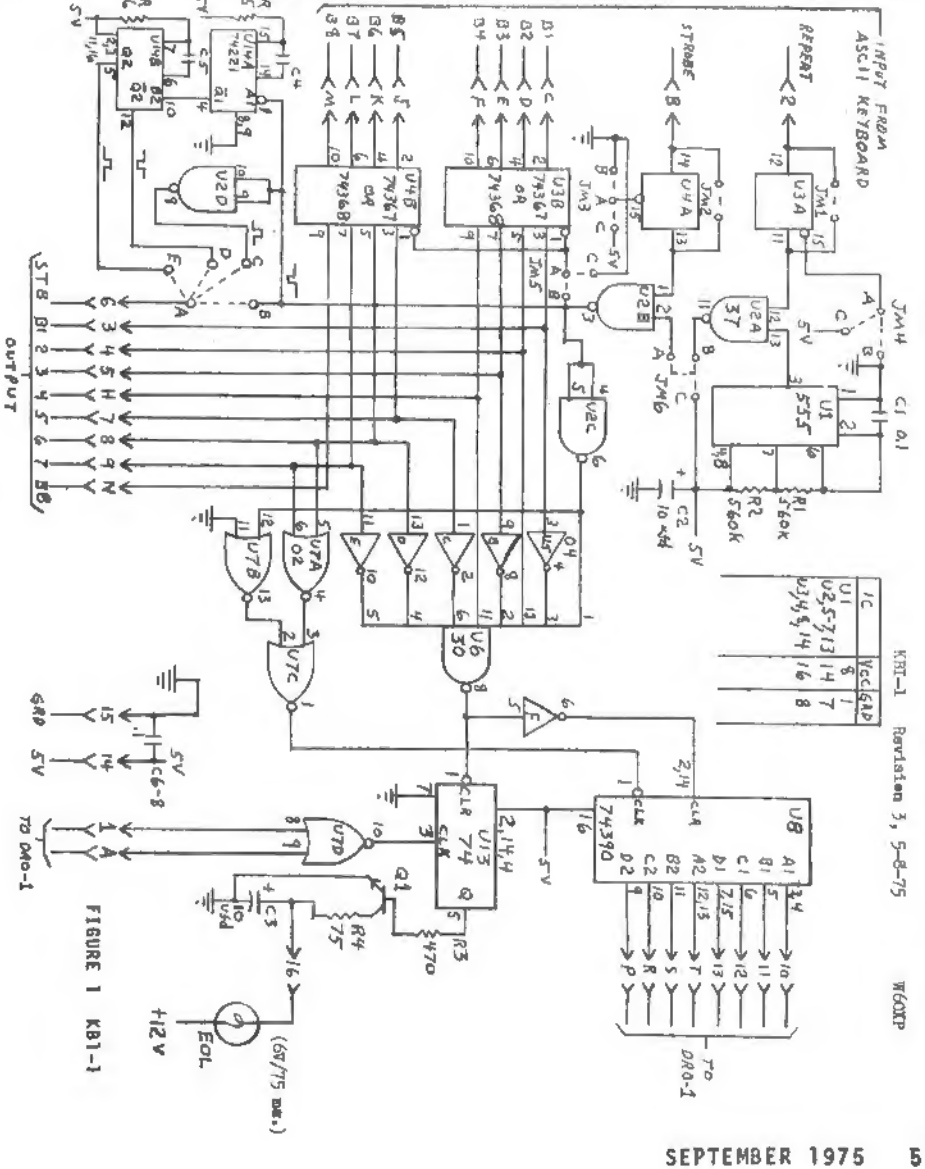


FIGURE 1 KBI-1

were encountered in check-out including poor solder joints, missed solder points, trace to trace solder bridges, overloaded power supplies, and in several instances defective ICs were found. In each case a carefully thought out, logical approach to troubleshooting pin-pointed the problem area. While a good triggered oscilloscope is a most useful adjunct to logic circuit troubleshooting, it should be pointed out that Peter, K6SRG debugged and checked out early prototypes of the KBI-1, the ABC-1 ASCII to Baudot Converter, and UT-4 IF circuits using nothing but a VOM (and an ice cube to find a temperature sensitive 74390!).

The KBI-1 was designed to be located in the immediate vicinity of the ASCII keyboard. Leads from the keyboard data outputs to the KBI-1 should not exceed 20 inches. Lines of greater length will cause ringing, especially on the keyboard strobe pulse. Ringing on the strobe pulse will cause multiple outputs from a single keystroke. Jim, WA7ARI used a six-foot cable between his keyboard and the KBI-1 but it was necessary to use type 75188 line drivers at the keyboard and 75189 line receivers at the KBI-1 outputs. You must use transmission line techniques for any line over approximately 20 inches.

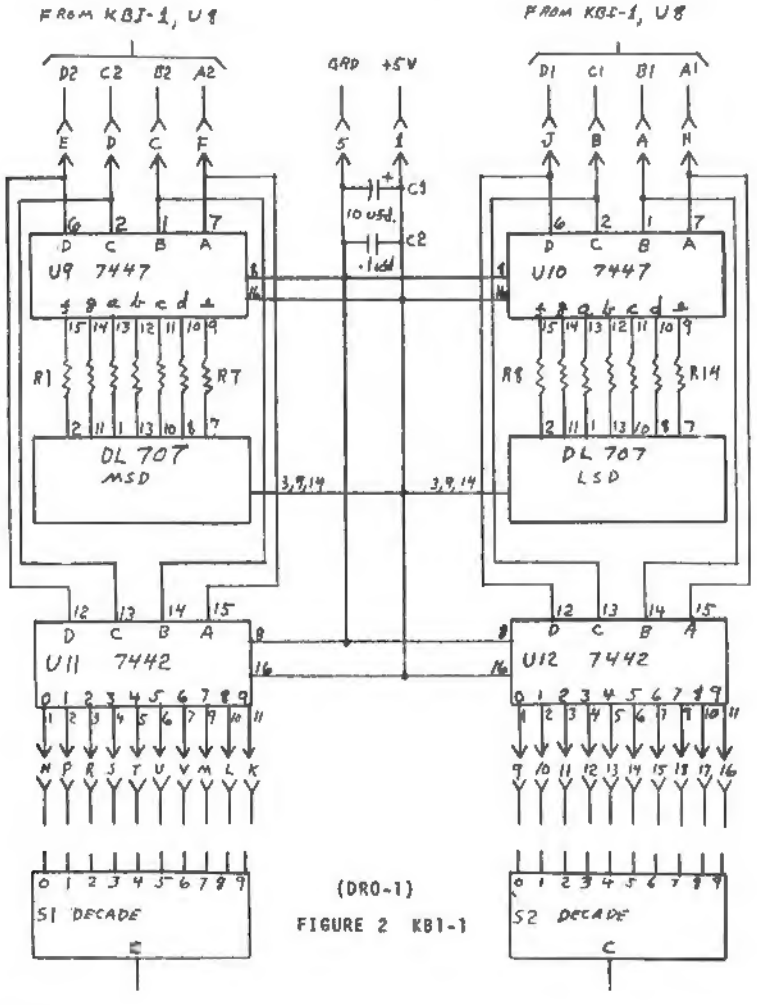


FIGURE 2 KBI-1

KBI-1 WITH TV TYPEWRITER DISPLAY

Many RTTY enthusiasts have built the Southwest Technical Products Corp. (SWTP) "TV Typewriter" video display. Figure 3 illustrates a special adaptor used between the KBI-1 output and the TV Typewriter input so that the video display has a CR/LF on receipt of LF instead of CR. The video display will still provide automatic CR/LF at the end of its 32 character line if a LF is not received prior to this point. Credit is due WA7ARI for developing this circuit.

ACKNOWLEDGMENTS

Recognition and appreciation of their contributions, comments, and encouragement is due members of the 3612.500 autostart net, in particular W6FFC, W6GQC, K6SRG, WB6WPX, and WA7ARI. Thanks is also due those members of the net whose patience was sorely tried during the development period. Others who contributed comments and suggestions included K2SMN, WA5NYY, and KL7HOH. The author extends his apologies to anyone whose contributions were overlooked.

ASCII TO BAUDOT CONVERSION

A forthcoming article will describe an ASCII to Baudot converter (ABC-1) that converts ASCII data from the KBI-1 to parallel format Baudot 5-level code and outputs this data to a FIFO/UART combination such as the UT-4.

GENERAL COMMENTS

Console fabricated from .060 aluminum and covered with black matte vinyl shelf paper @ .39 yd. Experience has shown that self adhesive paper is easier to work with than aerosol paint on several homebrew cabinet projects. Titles are usual dry transfer lettering. Put dry transfer lettering on Magic Mending tape first, then cut out title and stick on vinyl. This builder has had excellent results with this method, and black on tape on bare aluminum gives a professional look also.

Bottom plate has no components mounted on it for ease of access to all circuitry. Rear apron with all power supply circuitry and loop keyer is also removable for easy access. Keyboard is sloped at 10 degrees from the horizontal as recommended by Microswitch. Review of several brands of computer terminals also were designed for a 10 degree slope.

HEAT - everybody talks about heat. Only one component "really generates" heat. That is the bridge rectifier for the -5VDC power supply. Individual regulators were used for each PCB. An LM309 for the keyboard, and Fairchild 7805's for the KBI-1 and ABC-1. The 7 segment display is hooked to the LM309.

-5VDC power transformer is 7.5 VAC at 3 A. Initial use of 6.3 VAC transformer for the 5VDC power supply caused serious glitches on the VCC lines. DON'T use 6.3 V transformers.

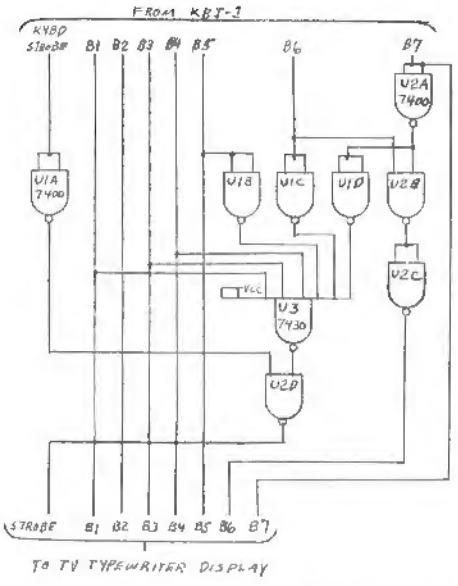


Figure 3. Adapter for driving SWTP TV Typewriter Video Display from KBI-1.

KBI-1 PARTS LIST			
U1	555	U13	7474
U2	7437	U14	74221
U3,4	74367 or 74368	C1,6-8	0.1 mfd
U5	7404 (See Tex	C2,3	10 mfd, 16 volts
U6	7430	C4,5	selected, see text
U7	7402	R1	560K 5%
U8	74390	R3	470
		R4	75 1/2W
			EOL lamp 6v/75 ma

DRO-1 PARTS LIST	
U9,10	7447
U11,12	7442
Display	DL707 or equiv.
R1-14	270 ohm
C1	10 mfd, 16 v
C2	0.1 mfd
S1,2	Decade thumbwheel switches

***

Beginners RTTY Handbook

SEE JULY-AUGUST ISSUE FOR CONTENTS

Price $2.50 pp.

RTTY JOURNAL
PO Box 837
Royal Oak, MI. 48068

***

VHF RTTY NEWS

RON GUENTZLER, W8BBB Editor
212 GRANDVIEW Blvd.
Ada, Ohio 45810

The 7th BARTZ VHG RTTY contest will be held at 1700-2300 GMT Saturday SEP 13 and 0600-1200 GMT Sunday SEP 21 for amateur stations within Zones 14 and 15. Portable operation is permitted, but it must be from only one location. Logs will be welcomed from SWLs.

Many thanks to Ted Double, 89 Linden Gardens, Enfield, Middlesex, England for sending the information to us. Additional details may be obtained from Ted or Eric. If the information via this medium has reached anyone too late for this year's contest, remember that it is an annual affair and that Ted or Eric can be contacted next summer for information for the contest next year.

The following information from Warren "Buck" Buchanan, WAØLEM, shows how "advertising" can help build up activity. "Just a short note to let you know that VHF RTTY is still alive and kicking in the Kansas City area. Due to the last information you put out on us here, we picked up at least two new stations that did not know anyone was active in this area.

"Enclosed is a handout sheet we used at a local hamfest in this area. The demonstration we had at the hamfest was well received and of interest to a lot of hams. I think it was their first exposure to a working RTTY system and we really had a fine time demonstrating it and answering questions. We ran pix tapes and let the guys have a turn at the keyboard if they wanted. The result was several new stations showing up on frequency with machines and converters wanting to know what to do next. Needless to say, they received a lot of help and we have almost doubled the number of stations since last JAN.

"Most stations monitor voice for newcomers who might show up, and we are always glad to hear a new call with questions about RTTY. Listed below are the stations that are on RTTY, or at least receiving, and I am sure that they would be glad to give a helping hand to anyone interested.

"WØSHY, WAØLEM, WBØIRI, KØJPR, WAØZMF, WØICU, WØOMY, KØOVD, WAØFBQ, KØFZQ, WAØZIF, K4KEW, WAØKHP, WØNXU, WBØCYA, WØHSK, WAØKDJ, WBØIKT, WBØPIE, and WØAT. Current operations are on 146.700 MHz, FM, AFSK, 2125 Hz Mark, 2975 Hz Space, with some stations experimenting with 170 Hz shift, 2125 Hz Mark, 2295 Hz Space."

The fact sheet or information sheet that they handed out at the hamfest looks like an ideal model for use by others. If you want a copy, write to Warren Buchanan, WAØLEM, 1703 Hands, Independence, MO 64055. Thanks, again, Buck.

John C. Huffman, W4IRE, sent along the following: "Here is a little news about VHF RTTY in Piedmont, NC: In the Winston-Salem to Salisbury area we have been operating (predominantly) simplex on 145.740 MHz. About a dozen stations are currently active. We have AFSK (850 Hz shift) on FM. Some minimal activty has occurred on 146.700 and 146.880 MHz, simplex. We have discussed going thru existing repeaters, but no action yet. Proposed technique would consist of adding a second receiver to the repeater for RTTY access with a narrow bandpass to prevent simultaneous use for voice communications."

From Jerry Buckler, WA3VRV we have: "Just a little note to let you know of the RTTY here in north east Pennsylvania. There are three of us on approx. 145.260, 850 Hz shift, AMAFSK. They are W3CH, Scranton, WA3HFP, Kingston, and myself, WA3VRV, Plains, PA. I understand that there is some activity on 146.700 MHz, AFSK on FM, south of here in the Harrisburg - Danville area."

We have a rather lengthy, but loaded with information, letter from Norm Sternberg, W2JUP, 2 Regal Lane, Levittown, NY 11756: "WR2AFC at Hempstead, Long Island, NY, went on the air in mid-1971 as W2JUP/2, then as WB2ZWR prior to the final, present call.

"WR2AFC is a RTTY-only repeater with input 147.870 MHz and output 147.270 MHz. It is a fully regenerative system using Selcal access rather than either COR (Carrier Operated Relay) or Mark-tone autostart. A modified Frederick 1301 Selcal unit activates the repeater when the Selcal recognizes a specific seven character code in 5-level (Baudot or Murray) TTY code at 45.5 baud (60 WPM). The Selcal will ignore signals other than 850 Hz (plus or minus 5%) or signals with greater than 15% distortion. Four additional characters are required to turn the repeater off. Should the repeater not receive Mark-Space transitions for 30 seconds, the repeater shuts down. Once on the air, the system is transparent to codes and speeds, regenerating whatever appears on the input side, with less than 5% output distortion.

"Receivers and transmitters are modified GE and Motorola units capable of maintaining CCS (Continuous Commercial Service) operation for carrier on periods up to five hours. The heavy duty cycle was found necessary when several stations are in a roundtable.

"The antenna is located at the 250 foot level on a local broadcast station tower and is fed by 7/8" pressurized line. Transmitter output is kept at 15 watts and the usable range is about 40 miles. Height above sea level is about 350 feet.

"The repeater is owned and operated by the Long Island Digital Society and is used by approximately 25 stations in the NYC-LI area.

"The Long Island Digital Society, Box 241, Levittown, NY 11756 or W2JUP should be contacted for the Selcal access information.

"Quite a bit of study has been made in the area of bandwidth occupancy of tone modulated telegraphy. Our receiver, a Motorola "A" Sensicon, is equipped with a very narrow IF filter and practice has shown that users should transmit with a Mark tone deviation at 2125 Hz not more than 3 kHz peak. The deviation of the output transmitter is set at approximately 3 kHz peak at 2125 Hz. Because the local area is completely saturated by repeaters on 15 kHz splits (sounds like the LA area - see that column last month - RG), adjacent channel protection and freedom from intermodulation have been primary concerns in system design.

"One of the most useful test devices in constant service is the Heath SB630 Scanalyzer configured as a "poor man's" spectrum analyzer. Tone deviation levels of user's stations are initially set up remotely using a system shown on an attached sketch. . . . Even with a relatively inexpensive unit like the Heath SB630, establishment and maintenance of system standards is well within the capability of the moderately knowledgeable amateur operator.

"Considering the case of the complex signal with 2125 Hz Mark and 2975 Hz Space tones, we find that for 3 kHz deviations on Mark tone, an estimated IF bandwidth of 15.5 kHz would be required; for 2975 Hz Space tone, **ignoring transmitter preemphasis**, an estimated IF bandwidth of 17.9 kHz would be required.

"The above shows why it is recommended that 2 meter FM RTTY systems be operated at modulation indices of 1.5 or less, to conserve receiver bandwidth requirements and minimize adjacent channel interference to 15 kHz split channels.

"There is also an excellent argument for the use of 170 Hz shift and 2295 Hz Space as a further aid to reducing bandwidth requirements. For example, assuming 2125 Hz Mark and 2295 Hz Space, at a modulation index of 1.0, the following results can be predicted:

Modulating Frequency kHz	Nominal Deviation kHz	IF Bandwidth kHz
2.125	2.125	12.75
2.295	2.295	13.77
2.975	2.975	17.85"

Thank you, Norm. The difference in bandwidth between the 2975 and 2295 Hz Space tone with no preemphasis is quite interesting.

Thanks to everyone who supplied information this month. It's really nice to have so much and such a variety. Please keep the information coming.

73 ES CUL, RG.

***

UART PROBLEM

Here is a short note to add to your magazine for those with UARTS. It takes care of a few problems.

If you have a UART (the UT-4 in particular), then you have a problem that you may not know exists.

I found out about it when trying to send a friend about 5 miles away a picture. Seems that there were quite a few missing characters - on an average about 1 missing character per 2-3 lines.

After many hours of investigating and trying to figure out what was going on, it was discovered that there is a circuit in the UT-4 that is there to inhibit a character from entering the FIFO if there is a character being removed from the FIFO at the same time. This character is lost and there are no flags to indicate that the character has been dropped.

There is an easy cure for the problem. All you do is to cut the trace going to pin 27 of FIFO #1 and connect pin 27 to ground. That will take care of the problem.

CONTINUED ON PAGE 13

RTTY-DX

JOHN POSSEHL - W3KV
Box 73 Blue Bell, Pa., 19422

Hello there. . .

Pierre, OD5HC, continues to give the rare Lebanon prefix to all comers by his consistent activity on the 14 mhz. band. It is interesting to note that he was present at the Hamvention at Dayton in April where he acquired the HAL Video Printer and dual mode solid state keyboard. However, with the 10k or so hams present at the convention we never did get to meet him. Pierre promises to return again next year.

QSL cards from LZ1KAB are being received by the fortunate ones that made contact during his first week of operation. The station has not been active since that time and perhaps mechanical problems in the machine are the cause. As mentioned earlier, LZ1KDP is another possibility from Bulgaria in the near future.

OE5CA/YK continues to be very active but alas on 14295 khz SSB but he does venture down to 14095 and RTTY on occasion. QSL via OE5REB,

Dr. R. Eisenwagner
Air Base Met. Office
A-4063 Horsching, Austria

Since early June OX3DL has been very active from Egedesminde on the west coast of Greenland. Being a commercial operator RTTY is not new to Ole but this is his first venture into the ham bands on this mode. He is active almost daily and at most any time. He is presently getting set up for RTTY via Oscar 6 and 7. QSL to. . . Ole Baadsgaard

P.O. Box 84
Egedesminde, Greenland

In mid July we made contact with OX3KS who was just setting up his station on RTTY and was looking for Ole at the time. Soeren is located at Julianehaab on the south coast of Greenland.

C3 1PY was due to be active from Andorra from 3 to 11 of August. Unfortunately the news arrived a bit too late but if you did make contact you QSL via F2PY. Pierre seems to make an annual trip to this rare spot so if you missed him you may find him again next year.

The ST-5 and AFSK unit generously donated by W3EKT and K4GMH arrived at The Vatican and now HV3SJ is permanently QRV on RTTY. Brother Ed had some problems getting the unit going but Tony, IVØJX, who is located in Rome went over to the Vatican and got things going in fine shape QSL to. . .

Curia Generalizia Gesuiti
P.O. Box 9048
Rome, Italy

James, YJ8JS, was guest of I5WT and I8AA on his recent trip to Italy. James intends to be in operation again from New Hebrides in early October, hopefully for the CARTG Contest.

Some of the most sought after prefixes in the UK have been quite active this Summer. GI4AHP, GM4BIP, and GW3TMH were all on with fair regularity. Now when do we hear from GC and GD???

DM2AYO is fairly active from East Germany (counts as separate country, you know). We understand that calls with the figure 2 are privately owned stations and those with number 3, 4, etc., are club stations. The last letter in the call denotes the state or province where the station is located.

At this writing, Bernie, HP1AH, has closed down operations from Panama and will soon be active as F9MH/W3 or W4 from the Washington, D.C. area. Being a member of the French Diplomatic Service, Bernie will assume duties as French Consul for D.C., Maryland, Delaware, Virginia and North and South Carolina. (Bernie says, please, no visa applications for Clipperton). His new duties will keep him in the area for the next four years and the new QTH is. . . .

Bernard Malandain
French Consulate
2129 Wyoming Av.
Washington, D.C.

Although there is a Model 28 resting at HP1EE he is too QRL to get things set up so it may be some time before Panama is again on the active list.

Should you need Canary Islands look for EA8FO and EA8GK. Both had been quite active during June and July. Also from Africa 5L2F is an unusual prefix (EL2F) at around 14100 khz when he completes his traffic to the States. TU2FL and TU2GA are active, the latter being ex-5U7AZ but sans RTTY gear while there, however, Carlo, 5U7BA, continues to keep Niger on the active list. After being QRT for two years investigating the mysteries of SSTV, Jo, CR6CA is again active and would like to meet old friends via the keyboard.

From the USSR some stations recently active are UA3FT, UK3XAB, and UV9PP. The latter, Alex, is not to be confused with Gene, UA9PP, although they are located in Novosibirsk and live quite near each other.

Some Far East possibilities are JA8JL, JH1QKG, KA2TS, and VS6CL while active has not yet filtered thru to the East coast, DU1POL continues to be one of the strongest signals into this area, outside of JA1ACB, that is.

Frank, 9Y4VU, has been QRT due to building a new house and the arrival of a new Jr. Op. With the new location just 150 yards from the sea you should have no trouble printing him when he gets going again. In the meantime Allan, 9Y4LG, has been doing a great job keeping Trinidad active.

It has been sort of difficult to find "down under" stations in this area in recent months but if you stay up late enough or get up early enough you can occasionally find VK2SG, VK3KF, VK3NR, VK3BEN, VK5IF, VK6CT, and ZL1AQQ. VK2BKE/Lord Howe is still a good bet for near future activity.

Wolf, DL8VX, was travelling around Europe in July and while in France was signing FØBT. With RTTY gear and a ST-5 he had high hopes of getting to Corsica to give the boys some much needed /FC activity. Unfortunately this was not possible due to the fact that the shipping from the coast of France to Corsica was booked up solid for the entire Summer and it is a bit difficult to stow-away with a RTTY machine and other assorted gear tucked under each arm. Wolf regrets the delay but will try again at a future date. In his travels he did get to visit with F6ALL, F6CDB, PAØAA, HB9AVK, and G4CTQ.

This coming September Bud, W2LFL, and Knobby, W2PLQ, plan a visit to England and the Continent. Sid, G4CTQ, had been doing the arranging on that end, the safari by motor caravan was to start from Sid's location, and Sid was to accompany the boys on the trip. At this writing plans have changed somewhat as Sid has been alerted for an assignment in The Zambia. This means that the boys will probably be on their own and will do their travelling by EURAIL on the Continent. Their tentative schedule is as follows. Depart Kennedy on 27 September, arrive London on the 28th. October 1st on the Continent to France, then to Switzerland, Italy, Austria, and Germany. Next to Luxembourg and from there to Belgium. Back to Germany again and then to Denmark, Sweden, and Norway. Finally back to England on about 21-22 October and home. Specific calls have not been mentioned as many of the key stations along the route of travel have already been alerted and these stations will inform the local RTTY groups or individuals as to when the boys will arrive in the area. For a guide as to elapsed time all stops will be overnight and perhaps an additional day in some places time permitting. There is still time for an up-date in next month's column so we will keep you posted. And of course we are all on "pins and needles" wondering what Sid's ZD3 call will be and when.

A new Award is available for RTTY. Issued by the C A R T G it is called the "All VE/VO on RTTY Award". Rules are as follows.

1. Contacts must be 2 way RTTY only with all 10 VE/VO districts. Any date.
2. Award will be a certificate numbered from ONE.
3. No charge for the ward, but QSL's are to accompany the request. They will be returned.
4. An official of a RTTY Group or Society may inspect and send in a signed list of QSL cards with all information included (in place of sending the actual QSL's).

Send all requests to..C A R T G VE3RTT
85 Fifeshire Road
Willowdale, Ontario, Canada
M2L 2G9

The S A R T G RTTY Contest is about to start when you receive this, so we hope to have a report next month.

73 de John

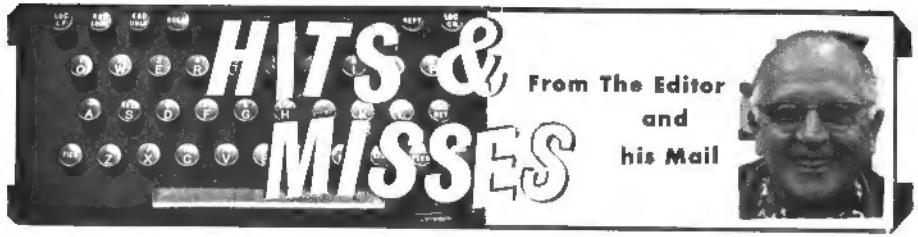
******

National ARRL Convention

We hope to attend the ARRL National Convention near Washington in September. John, W3KV, also plans to attend so hope to see some of you there.

AMRAD will hold a RTTY forum at the National Convention and also have a booth to demonstrate their RTTY repeater and outline plans to incorporate a mini-computer into the repeater to perform a variety of tasks. If you go be sure and look them up.

*****



UART reprints, -- Boy have we got them. . .Early in the summer we mentioned that Clyde Keenan, K7WTQ, hoped to furnish us with some. Then Clyde got busy and we decided to rerun in an 8 1/2 x 11 format the four articles on the UART. The same day we picked ours up from the printer Clyde's arrived. Have we got UART reprints. . . .

Clyde's are regular JOURNAL size so would fit in the JOURNAL binders. Ours being larger have slightly larger drawings and illustrations.

Since it takes 30¢ postage and a nickle envelope to mail them we offer one of each complete reprint for 40¢, first class mail or 3 sets for $1.00 by third class mail. foreign requests 50¢ each.

Have we got UART reprints. . . . . .

***

A number of foreign subscribers pay with US Postal Money orders. This is satisfactory but takes from 3 to 6 weeks delivery. Also the name and address is usually mispelled or incomplete. If it is a renewal this is no problem but on new subscriptions we suggest a letter in advance with all the information. Bank drafts are acceptable and can usually be included with a letter, many send US money in a registered letter and this was worked out well. Do not send a personal check on any bank outside the United States as they can not be cashed. If you are ordering through a local subscription agency please remind them that it must be payment in advance. We have no way to send a bill.

***

Recently we have received a number of sophisticated solid state articles using computer technology and doing all manner of exotic things on RTTY. This is fine and we have a number on hand for publication in the future. However we do not want to forget a great number of readers who for several reasons may not be interested in such complex controls but would like information on printers, TUs, mechanical stunt boxes, using various exciters on RTTY or any number of things a beginner runs into. Articles on any of these things are still more than welcome.

***

BACK ISSUES -

New subscriptions and classified ads are cash in advance as we have no method for billing. New subscriptions will be started with the current issue and one back issue, if requested. Please do not ask us to start any further back than this. Back issues - if available - may be ordered at 30¢ each at time of subscription. The JOURNAL is mailed about the 20th of the month preceding the dated month. May and June are a combined issue and July-August is a combined issue.

The ONLY back issues available are listed below. 30¢ each.

1972-SEPT.-OCT.-NOV.-DEC.[4]
1973-ALL ISSUES [10]
1974-FEB.-NOV.- [2]
1975-JAN.-MAY.-JULY.-[3]

RTTY Journal Binders $4.00

***

RTTY JOURNAL
Box 837
Royal Oak, Mich. 48068
Editor & Publisher 'Dusty' Dunn, W8CQ

SUBSCRIPTION RATES

U.S. Canada- Mexico	1st Class	$3.00
	Air Mail	$3.50
Other Countries	Surface Mail	$3.50
AirMail South-Central America		$6.00
Air Mail	All Other Countries	$7.00

HAM COMPUTERS

KEN HOPPER
4021 S. Bowman Ave.
INDIANAPOLIS, IN. 46227

They are called Microprocessors, Microcomputers, and Minicomputers. In a 1956 edition of the Scientific American Magazine an editor said that within 20 years we could see powerful computers in our homes. That was when a single control unit occupied more than 200-cubic feet of lab space. That farsighted individual was indeed right, and we beat his prediction by a full 2 years. The Mini units are small and can be purchased in a single LSI chip. The capabilities of the Mini CPU on a Chip are beyond even the wildest dreams of us Hams in 1956. Ham RTTY is a natural application for the microprocessors because digital communications is at the heart of their design objective. If you haven't been innoculated by the Computer Hobby -- take heed -- there is a new direction for home brewed RTTY gear.

The Microprocessor LSI units were selling for about $375 in July 1973, for $110 in July 1974, and for $39.95 in last month's issue of Popular Electronics mag. The typical instruction set is marvelous and the total investment is less than one of the popular Video terminal units. So what can you get for $300 - $800? First, you get the heart of the computer, the CPU chip. Then you add a power supply (- 5VDC), and as much memory as you can afford. Your present RTTY terminal (KSR) is great for microprocessing. Now you can replace all that digital processing gear in the shack. You can purchase programming for your computer, or write your own. The unit looks like a 'Variable piece of Hardware', and it will do at least these things: Send and receive CW (any speed), send and receive RTTY in Baudot or ASCII (any speed to 9.6kb), operate as a 48 key scientific calculator, look like a super FIFO, UT-4, UT-2, RM200, Stunt box, USART, Regen repeater, Digital Autostart, Diddle-anti-diddle device, SELCAL, Freq. control/display, Automatic logging unit, RY generator or test signal unit, Memory box for contests, Callsign lookup and recorder, or any other digital device that you can dream up and interface to the numerous I/O ports of the minicomputer. You can add a $125 TVT II from the Digital Group Clearing House and have a 16 line by 64 character TV display as your output device. When you finally give the rig a rest, the family can put it to good use playing Ping-Pong on the TV screen, balancing the Check book, printing a grocery list from your inventory control, controlling your lighting and security system, and even teaching your kids the fundamentals of computing (or they may teach you!!!) These applications are not pipe-dreams for the year 1980. Far from it. . .WØLMD had shown these things are operating now, and he has extended his interests to Slow Scan where he has used the microcomputer for Color Slow scan, slow scan with movement and even speech synthesis (his unit talks back to him!!) Please join the computing hobby by subscribing to the publications listed at the end of the article and your support will stimulate even more wondrous applications. Any sensor based task can be automated through an interface IC and the microprocessor unit. I am sure you fellows can already see super things to do with these new 'Black boxes' in your own professions. For instance how about controlling automatic functions and in consumer appliances?

Stop building all those individual units for the shack. We can now build one device and make it appear to be several things at once. The popular INTEL 8008 chip can execute over 2000 instructions during ONE 22 millisecond RTTY pulse. There are excellent kits available. And you will see a flood of peripheral I/O units on the market soon. Don't be discouraged about the special jargon and the complexity of the hardware. With a little help, we can all make it work like a pro.

Many thanks to Bud WAØIOT and Charlie K2JUW for their interest in this article.

***

UART PROBLEM

CONTINUED FROM PAGE 7

Also, once in a while when the UT-4 is first turned on, the FIFO's will be full of blanks or letters. This can be eliminated by the addition of a 47 PF cap across the memory clear switch. This also seems to take care of the lock up problem on the TI UARTS.

Another thing that will improve operation is the addition of an optical coupler to the loop. Use it instead of the diode-resistor combination that goes to pin 2 of IC 1A. Tie the collector of the photo-transistor to pin 2 of IC 1A and the emitter to ground. Disconnect the ST-6 FSK line from the diode - resistor combination and use the optical coupler. Of course, observe polarity on the optical coupler lead. This will help get rid of any noise or spikes that you have in the loop.

There are about 10 UT-4's in the Portland area and all that have been modified are working 100 percent now.

Much thanks to K7MMK for the use of the 45A scope. Without it, we would not have found the problem.

Mike W7HYG Walt WA7NAK

CLASSIFIED ADS-- 30 words $2. Additional words 4¢ ea.

Cash with copy, Deadline 1st of Month.

TECH MANUALS -- $6.50 each: TT-63A/FGC, CV-591A/URR following manuals $8.50 each: TT-47/48, R-388/URR, USM-50, 51J4, FR114/U; following manuals $10.00 each: R390A/URR, SRR-11, 12, 13, USM-32, URR-35C. Special manuals (Limited quantity): TM-03315-15 TGC-14/14A $10, Navships 95898 TT-298A/B, TT-299A/B $12.50, Navships 0967-170-8010 UGC-38, 40, 41 $12.50. Model 14 TD manuals $2.50 each. Thousands more in stock. Send 50¢ (coin) for large list. W3IHD, 7218 Roanne Drive, Washington DC 20021

MORE RTTY! ONLY HAM RADIO MAGAZINE consistently brings you more RTTY articles and better RTTY articles than any other general amateur magazine. You need RTTY Journal, but you need HAM RADIO also. $7.00 per year, $14.00 for 3 years. Ham Radio, Greenville, NH 03048.

SELL TWO MODEL 28's both auto car ret and line feed, down shift on space. One is floor model with 60-75-100 WPM gear shift, other is 60 WPM. also two CV483Y URA-17 solid state converter and two R-390A Receivers. Also CE200V. Purchaser to pick up. W4AIS, 306 Thornwood Dr., Taylor, S.C. 803-268-2518.

"UT-4 PC. BOARDS Set of four plated and drilled G-10 epoxy glass boards (not thru hole plated) 2 7/8" X 7" with provisions for 12 pin edge connectors. Boards include XB-6 Dual Clock, Two UT-4 boards, and power supply board including plus 5 volts, minus 12 volts, and plus 12 volts. All boards are two sided with the exception of the power supply. $15.00 Postpaid. Clyde Keenan, Rte. 1 Box 309, Lakebay, Washington, 98349 1-206-884-3838"

DOVETRON MPC-1000 MULTIPATH-DIVERSITY RTTY Terminal Unit with automatic Multipath Corrector, Full In-Band Diversity, 2 inch CRT cross display, continously variable mark and space channels (1500 to 3200 Hz), active integrated circuit filters (no toroids), noise correlator, dual autostart (Marking or FSK RTTY), phase continuous-sine wave AFSK tone generator, EIA and MIL FSK voltage level outputs, CW ID provisions for AFSK and FSK, internal RY generator, automatic mark-hold, anti-space, anti-CW, anti-fade, adjustable internal 180 volt loop supply, signal loss indicator (LED) loop keyer monitor (LED), provisions for Uart/FIFO interface. 17" x 3.5" x 9", 10 lbs., 110/220 vac, 50-400 Hz $495.00 FOB stock to 30 days ARO. Your QSL will bring complete specifications. DOVERTRON, P.O. Box 267, 627 Freemont Avenue, South Pasadena, Ca. 91030. (213-682-3705).

ANY ISSUE OF RTTY JOURNAL reproduced $1.00 PP. I have a complete file of all issues. R. Wilson, WB0ESF, 4011 Clearview Dr. Cedar Falls, IA. 50613

HAL COMMUNICATIONS CORP: Headquarters for electronic RTTY equipment. In demodulators, choose from the incomparable ST-6 or, for a low cost beginning in RTTY, the ST-5. Tailor either to your requirements by selecting the 425 Hz press discriminator, the XTK-100 or AK-1 AFSK oscillators and the ST-5AS autostart for the ST-5. Full details available in our current catalog. Compare before you buy. BankAmericard and Master Charge plans available. HAL COMMUNICATIONS CORP., Box 365RJ, Urbana, Illinois 61801. Phone 217-367-7373.

FOR SALE. REASONABLE. Electracom FSC250 RTTY terminal unit. All shifts switchable, built in scope tuner and Electrocom tone keyer for 170 shift. Excellent condition, all manuals and equipment up to date by factory. Make me an offer. Ed Trengo, W9WKC, 856 E. Washington, Hoopeston, IL. 60942. Phone (217) 283-6914.

NEWS-NEWS-NEWS - Amateur Radio's Newspaper, "Worldradio", Trial subscription - Two issues for one dollar. "Worldradio" 2509-F Donner Way, Sacramento, Calif. 95818.

RTTY VIDEO DISPLAY UNIT: 1000 characters, plugs into loop or logic circuits. ASCII or BAUDOT available. Works with any TV set. Leland Associates, 18704 Glastonbury Rd., Detroit, MI. 48219

LOADS OF MODEL 15KSR TELETYPES only $25.00. Also quantity of model 19s with tables, power supplies, TDs, Reperfs, character counters, etc. Only $65.00. C.B. Goodman Co. 5454 South Shore Dr. Chicago, IL. 60615. Phone anytime - (312) 752-1000, extension 516.

OA-5 SOLID STATE TU includes autostart and AFSK oscillator. See February and September 1974 issues of "RTTY Journal". Drilled and plated boards, $15.00; board with parts, $110.00; completed unit, $225.00. FOB. Ken Simpson, WA8ETX, 3700 Mountview, Alliance, Ohio 44601.

SELL TWO 28's, ONE FLOOR MODEL with three speed shift, and other one is table model at 60 WPM all with non overline and auto car ret. also 2 CV-483/URA-17 solid state tu's (dual diversity operation, also 2 R-390-A Receivers perfect cond. and one Central Electronics 200-V Transmitter. Make offer. Purchaser to pick-up. All equipment good condition. W4AIS, 306 Thornwood Dr., Taylors, S.C. 29687.

SALE: MODEL 28 TYPING REPERF. type 315/UG Code LPR-35 or TT317/UG code LPR-37, tape data 11/16" wide, Chadless or fully perforated; Good $25.00; Model 28 Transmitter Distributor type TT 334/UG code LXB-9 Good $25.00; Tuning forks 96.19 VPS. or 120 VPS. Unused $2.00 each; Mite motor PD/82U 115 V AC 60 cy Synchronous type unused with connector $18.00; High Speed Magnetic Tape Reader Ferranti Good $15.00; TT Socket wrench 5/16 with 12" handle .75¢; Kleinschmidt allen wrench on 12" handle Unused .95¢; GEARS 60 wpm for Model 14 T.D. with 18-- rpm Syn motor, Set Unused $5.75 Model 14 Typing Reperf: Gears for 60 wpm for 1800 rpm Syn motor, $6.75. Also available Model 14, 15, 19, 28, 32, 33 Machines as well as Lorenz Model 15. Send us a list of your needs. ATLANTIC SURPLUS SALES CO. 3730 Nautilus Ave Brooklyn New York 11224 (212) 266-2629

NS-1 PLL DEMODULATOR (Oct. '74 Journal) complete unit wired, tested $29.95 ppd. less switch, meter, power supply. Board only undrilled $4.75. Nat Stinnette Electronics, Box 1043, Tavares, FL 32778.

HAL COMMUNICATION CORP: Replace those machines with the HAL electronic RTTY RVD-1005 Visual Display Unit and DKB-2010 Dual Mode Keyboard. You'll have a quiet, reliable system allowing you to transmit and display Baudot code at all four standards speeds. Full details available in our data sheets. HAL COMMUNICATIONS CORP., Box 365RJ, Urbana, Illinois 61801. Phone 217-367-7373.

GOODMAN IS BACK IN CHICAGO. Model 15 KSR $25.00. TPR-311 Kleilschmidt's $50, tables $10. Female jack panels (80 jacks) New Mint in steel case - 19" mtg. $25. Model 15 RO $35, with keyboard $50. Panel Rack Cabinets 65" x 20" x 25" back and front door $50. Ditto 33 1/2" x 20" x 25". Model 14 printing reperforators $25. Assorted teletype tables $10 up. All kinds of teletype and electronics - no list - write your wants. Milliampere meters - 2 1/2" 0-100 center reading mounted slanted steel case with line & test switches & female plug (line indicator) AND cord $10. C.B. Goodman, 5454 South Shore Drive, Chicago, Ill. 60615. Phone 312-752-1000 - ext. 516 anytime.

CLASSIFIED ADS-

SALE: LORENZ Model 15 KSR in operating condition $75.00; Lorenz KSR with built in reperforator $95.00; Lorenz full ASR operation with Reperf. and T.D. built in. Good condition $125.00. All Lorenz machines come with Built in here-is answerback unit. Perforator tape 11/16" box of 10 rolls $3.90; case of 40 rolls $10.90; Copyholder for Model 28 cabinet $4.75 unused; Distortion test set with scope type TDA-2, 115 V Ac 60 Cy good $29.95; Distortion set, set type TS-2B/TG 115 V Ac 60 Cy very good $39.00; Model 15 platen unused $4.50. Model 28 Typing Reperf with keyboard TT 253A/UG complete with counter, end of line light, Chad type of punch. 115 V AC 60 Cy, Typing reperf is a LPR53 BWA, and motor in unit is a LMU-3 type. Unit complete with cover. $165.00 good but now checked; checked $215.00. ATLANTIC SURPLUS SALES CO. 3730 Nautilus Ave. Brooklyn N.Y. 11224.

HAL COMMUNICATIONS CORP. announces the availability of the RVD-1005A ASCII Video Display Unit. Serial or parallel data input, 110 or 300 baud, loop or RS 232 C levels. Request data sheet for full information. HAL COMMUNICATIONS CORP., Box 365RJ, Urbana, Illinois 61801. Phone 217-367-7373.

SELL: MODEL 19 COMPOSITE UNIT with power supply, keyer, converter, and 850 cycle AFSK unit. Fully diagrammed. $85.00. Scott Garfinkle, 437 Crescent Rd., Wyncote, PA. 19095. Call: 215-887-7896.

MODEL 28 COMPACTS, UGC-20 KSR, $350.00. UGC-25 RO, $275.00 Both excellent with 3 speed nylon gear shifts. Collins R648/ARR-41 HF receiver. $200.00. LARP reperf, $50.00. Mac McGinnis, 4304 McFarlin, Dallas, TX. 75205. (714) 528-4499.

RTTY STATION - HRO-500 RECEIVER, Teletype Models 34ASR and 34 KSR, Demodulators, AFSK, Solid-State Teletype Test Set, Two-Meter FM Base, 450 FM Base, 30-900 MHz Receiving System with Spectrum Display, Emcor Racks, Etc. - Write WA5OVG, 9660 Leaside Drive, Dallas, TX 75238.

MINICOMPUTER FOR SALE OR TRADE. SWL using Data General Nova 16 bit minicomputer to receive all speeds of Baudot and type on ASCII ASR-33 has two additional Novas available. When new (1970) they were $8,000. Asking $1,500 each with 4K of core. Or equitable trade including mint Collins R390A, 51S1, DRS-2, Tek dual trace scope. Webb Linzmayer, 16 Trowbridge Rd., Morris Plains, N.J. 07950 (201) 267-1299 nites.

HAL COMMUNICATIONS CORP. is closing out the RKB-1 RTTY Keyboard. A limited number of unassembled units are available. Write for details of this offer. HAL COMMUNICATIONS CORP., Box 365RJ, Urbana, Illinois 61801. Phone 217-367-7373.

WANTED: 32 ASR's COMPLETE. Must have UCC5, UCC6, or UCC18 all control units. Up to $400.00 depending on condition. Contact DCEB, Inc., 1878 Thunderbird, Troy, Michigan 48084, 313-362-0470.

MODEL 35 TYPING UNITS (Sprockett) with RO base, 100 speed gears (no motors) $175.00 ea. Two model 33 typing units (friction) $100.00 ea. Model 28 ESU $25.00 each. Model 35 stand alone, answer back units (no covers) $35.00 each. All in excellent condition. Bill Parker, K8NCV, 984 Amelia Ave., Akron, OH 44302.

WANTED - PRE-1974 RTTY JOURNALS, Especially 1970 and 1971 issues. Arnold Farkas, W8UPG, 651 Sanford Ave., Akron, OH. 44305

WANTED: MANUALS FOR TT-179, TT-117/120, HP-2000C audio generator. Crank for model 19, back issues of RTTY Journal. WB9OKQ, 913 Fair Oaks Rd., Menomonie, 54751

HAL COMMUNICATIONS CORP. announces the XTK-100 AFSK oscillator for those applications requiring the extra stability of crystal controlled tones. Tone pairs may be anywhere in the range from 1000 Hz to 3300 Hz with high or low tone pairs standard and others optional at extra cost. Constructed on a 3" x 6" PC board with pin-out identical to the AK-1 so that the XTK-100 is a direct plug-in replacement for the AK-1. Request data sheets for full details. HAL COMMUNICATIONS CORP, Box 365RJ, Urbana, Illinois 61801. Phone 217-367-7373.

FLOOR MODEL 28KSR MARK III with auto CR/LF, 28 printing reperf, both with 60/75/100 gearshifts; 28 TD with 60/100 gears, lot $500. HAL ST-6/AK-1 170/850 $250. All excellent. K2JW (609) 755-3704 days, (609) 234-3255 evenings.

B-6, JAN 4505.090 CRYSTALS $3.00. Capacitors-disc, mylar, electroyltic, tantalum available. Write for free list. NuData Electronics, 104 N. Emerson St. Dept. B, Mt. Prospect, IL. 60056.

HAL COMMUNICATIONS CORP. will show THE line of electronic RTTY equipment at Radio Expo, the ARRL National Convention, Findlay, Peoria and Cincinnati. Phone your orders for pickup at the show. Phone 217-367-7373.

UT-4 COMPONENTS. Demand has not dropped as fast as first anticipated. No change in supplying components until further notice. Consult prior Journal ads for items available and prepaid prices. GI-AY-5-1013 UART still $8.00, Fairchild 33512 FIFO $13.00, 2/$25. Peter Bertelli, W6KS, 5262 Yost Place, San Diego, CA. 92109. 714-274-7060.

ST-6, AK-1, 170/425/850 SHIFT, HAL CASE, new $290. ST-5, $85; ST-5 with autostart, $125; ST-5 with autostart, AK-1, $170. All new, tuned, complete: UPS prepaid 48. Fred Firestone WB9IEE, 806 N. School St., Normal, IL. 61761, 309/452-4032.

HAL COMMUNICATIONS CORP. announces the availability of the new improved ST-5 manual. ST-5 customers (give us your invoice number) can obtain one for $1.00 ppd, others $3.00 ppd. HAL COMMUNICATION CORP, Box 365RJ, Urbana, Illinois 61801. Phone 217-367-7373.

PC BOARDS FOR THE UT-4 double-sided, thru hole plated, plug-in edge connectors. Write for details. AK2 kit $19.95. XK-2 xtal AFSK kit $34.95. 8 digit 250 MHZ frequency counter completely assembled and ready for use $250.00. Electronic Development, Inc. P.O. Box 951, Salem, OR. 97308. (503) 399-9660.

BUTTONS; BEAUTIFUL, PERMANENT 2" button with safety clasp. RTTYRTTYRTTY etc. on yellow background with prominent "RTTY" in center. 60¢ each postpaid. Your call in center in Model 19 type, $1.50. Robert Morgan, 2374 Queenston, Cleveland, OH. 44118.

RTTY PICTURE PERF TAPES. Over 400 to choose from. Chad (fully punched, no lids) 11/16" standard Amateur 5-level tape. Guaranteed COMPLETELY error-free. Run times from 2 minutes to 10 hours. Wide range of subjects including works of art, landscapes, pinups, animals, cartoons, as well as all of the 1974 RTTY Art Contest entries. Send 16¢ in STAMPS for listing. Joe Dickens, WA9UGE, 601 S. Dodson Sr., Urbana, IL. 61801

HAL ST-6 w/ AK1-170-850 SHIFT. Hal tabletop cabinet. $250.00 fob. H. Beebe, W9OEQ, 20035 Burr Oak Lane, Mokena, IL. 60448. Phone (312) 479-9278.

Additional Classified

See Next Page -